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# A Heart Transplant Recipient Taking Tacrolimus is Experiencing Neurological Impairments

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## Introduction

Tremor is a common and debilitating neurological side effect associated with calcineurin inhibitor-induced immunosuppression, such as tacrolimus. We present a case study of a man who developed parkinsonism after using tacrolimus following heart transplantation. Our findings suggest multiple factors contributed to the patient's symptoms.

## Case Report

We assessed a 65-year-old male who had undergone heart transplantation after aortic dissection, Stanford type A with failed cardiopulmonary bypass weaning. The patient developed parkinsonism characterized by narcolepsy, tremor and bradykinesia after initiating tacrolimus. We did not conduct a thorough examination of the symptoms at an early stage, as they were considered to be a common general weakness that can occur after surgery. As a result, the symptoms persisted for over five months. The patient's magnetic resonance brain scan showed infarctions in multiple regions and diffuse atrophy (Figure 1).

A positron emission tomography-computed tomography (PET-CT) scan was performed revealing dopamine transporter binding deficit at the left striatum, caudate tail, and posterior putamen (Figure 2). These findings suggest that the patient's tremor and dementia may have been caused by dopaminergic dysfunction, and degenerative anatomical brain changes.

We suspect that tacrolimus may have contributed to these findings. Unfortunately, discontinuing tacrolimus was not feasible since there were no suitable alternative immunosuppressant available, given his feeding condition. 189 days after following the heart transplantation, we administered Levodopa, Rivastigmine, and Amantadine to the patient. We monitored the effectiveness of the medication and any potential side effects while gradually increasing the dosage (Figure 3).

The patient's Parkinsonism symptoms, including arousal, tremor and attention improved some extent with the aid of medical intervention and cardiac rehabilitation consisting of low-intensity aerobic exercise and muscle strengthening exercises, as well as maintaining the minimum effective dose of tacrolimus within the therapeutic range.

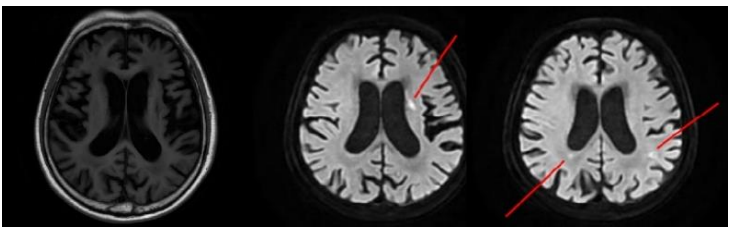

Fig 1. Diffuse brain atrophy, multifocal infarction in MR brain & diffusion

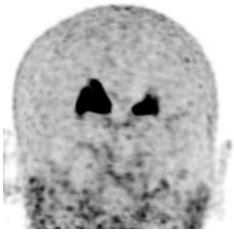

Fig 2. Asymmetric decreased DAT binding in PET-CT

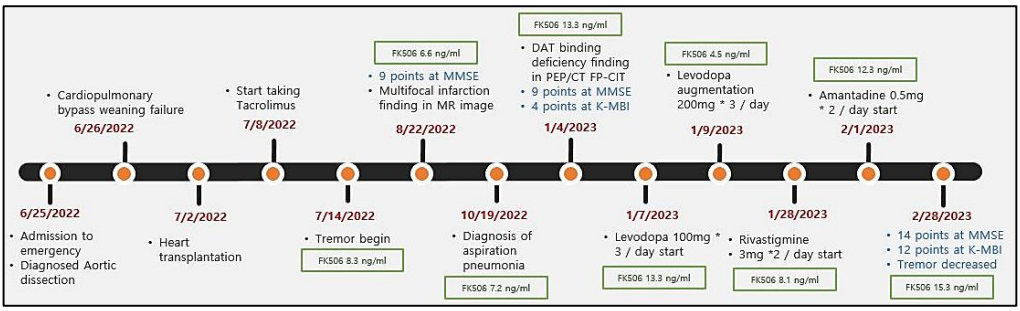


Fig 3. Timeline of the progress of the patient

MMSE; Mini-Mental State Examination, DAT; Dopamine Transporter, PET/CT; Positron Emission Tomography/Computed Tomography, K-MBI; Korean version of Modified Barthel Index, FK-506; Fujisawa Korea-506

## Conclusion

Possible side effects related to tacrolimus agents include parkinsonism, as seen in this patient. If suspected, early brain imaging and consideration of medication change, as well as the use of amantadine, should be considered. In patients using medications that can cause neurotoxicity including tacrolimus, early evaluation and consideration of early discontinuation of the medication may be important when neurological symptoms, including altered alertness, in addition to muscle weakness.